

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1-2, 8-13, and 27 are currently being amended.

Claims 26 and 27 are cancelled.

This amendment changes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claims remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-25 and 28-33 are now pending in this application.

Rejection Under 35 U.S.C. §102

On page 2 of the Office Action, the PTO has rejected claims 1-4 under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent 5,006,178 to Bijvoets (hereafter “Bijvoets”). In addition, on page 5 of the Office Action, the PTO has rejected claims 1-4 under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Publication Number 2003/0230332 to Venkatasubramanian *et al.* (hereafter “Venkatasubramanian”). Applicant respectfully traverses these rejections for at least the reasons set forth below.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See generally MPEP §2131.

Bijvoets fails to disclose a thermoelectric effect device comprising “a first electric conductor member and a second electric conductor member which have different Seebeck coefficients from each other” as recited in claims 1-4. Bijvoets also fails to disclose a thermoelectric effect device comprising:

connecting one of the electric conduction materials to a direct current source in-line constituting a Peltier effect heat transfer circuit system which has an endothermic section and an exothermic section, wherein between the endothermic section and the exothermic section, a distance is secured for so keeping a temperature T_a at the endothermic section and a temperature T_b at the exothermic section as to keep a relation $T_a < T_b$

as recited in claim 1;

a thermoelectric effect device comprising:

connecting at least a part of the electric conduction material to a direct current source in-line constituting a Peltier effect heat transfer circuit system which has n piece of the endothermic section and n piece of the exothermic section, wherein: between the endothermic section and the exothermic section, a distance is secured for so keeping a temperature T_α at the endothermic section and a temperature T_β at the exothermic section as to keep a relation $T_\alpha > T_\beta$

as recited in claim 2;

an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as recited in claim 3; and

an energy direct conversion system comprising:

2n pieces of the thermoelectric converter elements adjacent to each other being disposed alternately, thus forming ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T_1 of the thermoelectric converter element on a high temperature side and an ambient temperature T_2 of the thermoelectric converter element on a low temperature side as to keep a relation $T_1 > T_2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as recited in claim 4.

In each element construction of the Figure of Bijvoets, the heat stream within end pieces 8, 10 of the semiconductor part at the side of reference numeral 3 becomes larger than the heat stream within intermediate pieces 9, such as copper, by 3.7 times. Due to the well known heat stream, the heat generation quantities at both junction surfaces of bridge 5 and end pieces 8 and of bridge 5 and end piece 10, are mutually cancelled by heat absorption quantities of both junction surfaces of intermediate pieces 9 and end piece 8, and intermediate

pieces 9 and end piece 10. Therefore, bridge 5 is not at a high temperature. The same phenomenon occurs at the side of reference numeral 2. Thus, the temperature difference between two bridges 5 at the side of 3 and at the side of 2 in the drawing as described within Bijvoets does not occur and the temperature difference between two bridges 5 at the side of 3 and 2 according to the Peltier effect is physically and functionally impossible.

Consequently, and for at least these reasons, Bijvoets does not anticipate the presently claimed invention.

Venkatasubramanian fails to disclose a thermoelectric effect device comprising “a first electric conductor member and a second electric conductor member which have different Seebeck coefficients from each other” as recited in claims 1-4; a thermoelectric effect device “connecting one of the electric conduction materials to a direct current source in-line constituting a Peltier effect heat transfer circuit system which has an endothermic section and an exothermic section” as recited in claim 1; a thermoelectric effect device “connecting at least a part of the electric conduction material to a direct current source in-line constituting a Peltier effect heat transfer circuit system which has n piece of the endothermic section and n piece of the exothermic section” as recited in claim 2; and an energy direct conversion system comprising “a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$ ” as recited in claims 3 and 4.

Venkatasubramanian discloses a “thermoelectric device and method of manufacturing the device, where thermoelectric elements of opposite conductivity type are located on respective opposing sides of a heat source member.” Abstract. Venkatasubramanian further discloses that “[h]eat sinks are disposed on opposite sides of the thermoelectric elements ... [and] Peltier metal contacts are positioned between the thermoelectric elements and each of the heat source member and heat sinks.” Abstract.

Consequently, and for at least these reasons, Venkatasubramanian does not anticipate the presently claimed invention.

Applicant respectfully reserves the right to overcome this rejection by submitting a translation of the foreign priority papers or submitting other evidence of date of invention prior to the filing date of Venkatasubramanian.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejection under §102.

Rejection Under 35 U.S.C. §103

On page 6 of the Office Action, the PTO has rejected claim 5 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of U.S. Patent 6,271,459 to Yoo (hereafter “Yoo”). On page 7 of the Office Action, the PTO has rejected claims 6, 7, 26, and 27 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of U.S. Patent 6,100,600 to Pflanz (hereafter “Pflanz”). On page 8 of the Office Action, the PTO has rejected claims 8-9, 11-12, 14-15, 17-18, 20-21, and 23-24 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of U.S. Patent 5,987,891 to Kim *et al.* (hereafter “Kim”). On page 9 of the Office Action, the PTO has rejected claims 10, 13, 16, 19, 22, and 25 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of Yoo and further in view of Kim. On page 11 of the Office Action, the PTO has rejected claims 28-29 and 31-32 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of Kim and further in view of Pflanz. On page 12 of the Office Action, the PTO has rejected claims 30 and 33 under 35 U.S.C. §103(a) as allegedly being unpatentable over Bijvoets in view of Yoo and further in view of Kim and further in view of Pflanz. Applicant respectfully traverses these rejections for at least the reasons set forth below.

The framework for the objective analysis for determining obviousness under §103 requires:

1. Determining the scope and content of the prior art;
2. Ascertaining the differences between the claimed invention and the prior art;
3. Resolving the level of ordinary skill in the pertinent art; and
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Teleflex, Inc. v. KSR Int'l Co., 127 S. Ct. 1727, 82 USPQ2d 1385 (2007); *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). In order to establish a *prima facie* case of obviousness, all the claim limitations must be taught or suggested by the prior art. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). See MPEP §2143.03.

Here, Bijvoets and Yoo, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising “a first electric conductor member and a second electric conductor member which have different Seebeck coefficients from each other” as required by claim 5. Additionally Bijvoets and Yoo fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy
as required by claim 5.

Yoo discloses heat management in wafer processing equipment using a thermoelectric device which uses heat energy typically wasted in semiconductor processing systems to generate power. Abstract. However, Yoo fails to resolve the deficiencies of Bijvoets.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets and Yoo is improper and ought to be withdrawn.

Here, Bijvoets and Pflanz, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy
as required by claims 6-7 and 26-27.

Pflanz discloses a maritime power plant for producing, storing, and consuming regenerative energy that has the support structure on which energy producing devices produce the continuous supply of energy.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets and Pflanz is improper and ought to be withdrawn.

Here, Bijvoets and Kim, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 8, 11, 14, 17, 20, and 23; and

an energy direct conversion system comprising:

2n pieces of the thermoelectric converter elements adjacent to each other being disposed alternately, thus forming ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 9, 12, 15, 18, 21, and 24.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets and Kim is improper and ought to be withdrawn.

Here, Bijvoets, Yoo, and Kim, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 10, 13, 16, 19, 22, and 25.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets, Yoo, and Kim is improper and ought to be withdrawn.

Here, Bijvoets, Kim, and Pflanz, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 28 and 31; and

an energy direct conversion system comprising:

2n pieces of the thermoelectric converter elements adjacent to each other being disposed alternately, thus forming ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric circuit system converting from a heat energy into the electric potential energy

as required by claims 29 and 32.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets, Kim, and Pflanz is improper and ought to be withdrawn.

Here, Bijvoets, Yoo, Kim, and Pflanz, whether taken individually or in combination, fail to teach or suggest an energy direct conversion system comprising:

the first thermoelectric converter element and the second thermoelectric converter element being disposed in ambient temperatures different from each other, and a distance being secured for so keeping an ambient temperature T1 of the thermoelectric converter element on a high temperature side and an ambient temperature T2 of the thermoelectric converter element on a low temperature side as to keep a relation $T1 > T2$, wherein: taking out an electric potential energy from a certain section of the electric conduction material constitutes a direct energy conversion electric

circuit system converting from a heat energy into the electric potential energy as required by claims 30 and 33.

For at least this reason, Applicant submits that the outstanding rejection based upon the combination of Bijvoets, Yoo, Kim, and Pflanz is improper and ought to be withdrawn.

If an independent claim is nonobvious under §103, then any claim depending therefrom is nonobvious. *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988). See MPEP 2143.03. Thus, Applicant submits that claims 5-25 and 28-33, each of which ultimately depends from independent claims 1, 2, 3, or 4, are also non-obvious at least by virtue of their dependency from claims 1, 2, 3, or 4.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections under §103.

Provisional Obviousness-Type Double Patenting Rejections

On page 14 of the Office Action, the PTO has *provisionally* rejected claims 1-33 on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1-15 of co-pending Application No. 10/537,357.

Inasmuch as this is a *provisional* rejection, Applicant respectfully requests that the PTO withdraw its obviousness-type double patenting rejections. Applicant also reserves the right to take further action should the rejection become *non-provisional*.

CONCLUSION

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to

charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date 4/22/08

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